Space Weather Forecast

Issued on Thursday, 08 February 2024 at 01:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate activity and isolated R1-R2 Radio Blackouts expected. Chance of isolated Strong flares which may produce R3 Radio Blackouts, risk mainly Day 1 (8th Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with isolated Moderate class flares, the peak flare at 07/0331UTC from a moderately sized region, and magnetically complex, which is approaching the southwest limb. There are eight other sunspot regions on the visible disc, however the majority of these are small and relatively stable. The most significant region remains a large and magnetically very complex region in the southeast. Magnetic looping is evident in SDO imagery between this region, and several other regions on the southeast disc in close proximity.
A Coronal Mass Ejection (CME) that left the disc from near AR3575 early on the 7th has been analysed and Enlil modelling indicates that this CME is not expected to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar winds were generally indicative of a weak fast wind from a coronal hole with speeds generally around 500 km/s, peaking at 549 km/s at 07/2114 UTC. The Interplanetary Magnetic field (IMF) was weak. The important north-south component fluctuated weakly. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity expected, with isolated Moderate flares and a chance of Strong flares. These most likely from either the large and very complex region in the southeast, or from the smaller complex region in the southwest. This risk decreases slightly as the region in the southwest departs the disc today (08 Feb), although new or returning regions are expected to rotate onto the visible disc through the period, with the chance of significant flares increasing again.

Solar Wind / Geomagnetic Activity: The residual enhancement to solar winds from a coronal hole feature is expected to gradually wane through today (8th Feb), but especially tomorrow (9th) with wind speeds eventually declining to slow-ambient levels. A CME that left the Sun in association with a moderate class flare in the morning of 6th Feb may provide a slight glancing blow late tomorrow (9th Feb) or early Day 3 (10th Feb). The CME associated with the moderate class flare earlier on the 7th may give some slight enhancement at Earth later in the period, but this is both low confidence and a low probability. Geomagnetic activity is expected to be mostly Quiet, with a chance of Unsettled intervals and a very slight chance of a Minor Geomagnetic Storm interval should any CME enhancement occur Days 2-3.

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Energetic Particles / Solar Radiation: The count rate of energetic particles has a chance of rising above background in response to any large flares that may occur. This will bring an initial chance of reaching S1/Minor Solar Radiation Storms declining to a slight chance from tomorrow as the moderately sized, and magnetically complex, region in the southwest rotates frurther behind the southwest limb.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	50	50	50
Very Active	R3 to R5 X	No	20	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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